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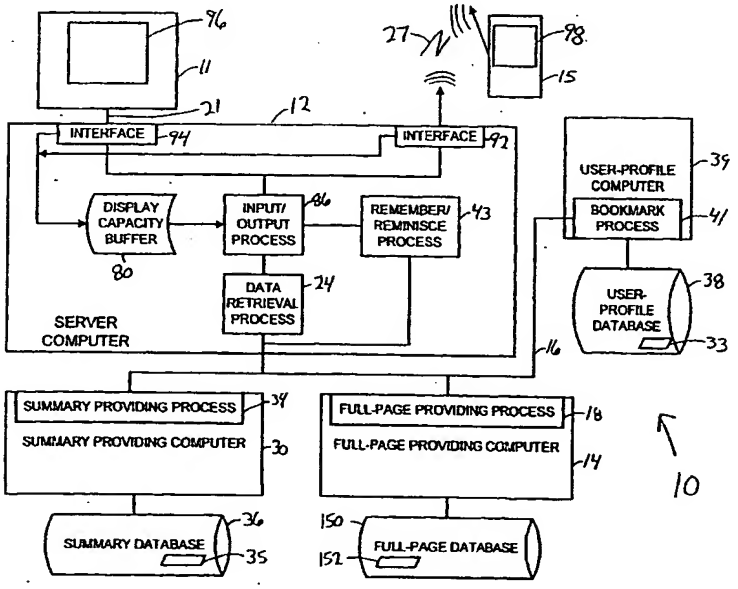
(54) Title: INTERACTIVE MARKING AND RECALL OF A DOCUMENT



(57) Abstract: A method (10) for saving a location of a web page for later recall includes serving a first version (30) of the web page to a client (11 or 15); and in response to a client input, storing information identifying a location from which a second version (14) of the web page is available.

WO 02/059734 A1

— *before the expiration of the time limit for amending the claims and to be republished in the event of receipt of amendments*

For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.

INTERACTIVE MARKING AND RECALL OF A DOCUMENT

FIELD OF INVENTION

The invention relates to software associated with internet navigation, and in particular, to software for the marking and recall of documents or other information.

BACKGROUND

Web pages are typically viewed using a personal computer system having a full-size computer monitor for displaying data. However, it has become increasingly common to use mobile, internet-enabled devices. Unfortunately, the mobility of such devices often comes at the expense of their displays. The display area on the displays such mobile devices, herein referred to as "miniature displays", can be much smaller than the full-size displays of a conventional computer systems.

Some servers of web pages can determine that a client requesting data is a mobile device having a miniature display. When such a server determines that a client has a full-size display, it serves a full-page version of the web page. When the server determines that a client has a miniature display, it instead serves an summary page version of the web page.

The summary page version of a web page is typically an abbreviated, or summarized version of the full page version. In many cases, the content of the summary page is so highly abbreviated that it becomes difficult to determine the content of the full-page that it purports to summarize. In those cases, a user may find it necessary to actually open the full-page version of the web page. A user who does so is then faced with enduring the tedium of scrolling through the full-page version of the web page using a miniature display.

A user having little patience for scrolling through the full-page version with a miniature display will often wait until a full-size display is available. However, this requires that the user remember the URL of the desired page. One way to do this is to cut and paste the URL to a clipboard and save it as a file for later recall. This is a multi-step procedure that is often too much trouble. Another way to do this is to simply jot down the URL and type it into a browser window later on. However, the length of many URLs makes this approach error-prone.

SUMMARY

The invention enables a user viewing a web page on a first device to save the location of that web page and later recall that location using a second device. Whether the web page is viewed with the first or second device, an appropriate version of the web page is served to that device.

In one practice of the invention, a method for saving a location of a web page for later recall, the method includes serving a first version of the web page to a client; and in response to a client input, storing information identifying a location from which a second version of the web page is available.

In one aspect of the invention, serving a first version of the web page includes detecting hardware used by a client and requesting a first version of the web page, the first version having content consistent with the detected hardware. This first version of the web page is then served to the client. The first version can either be retrieved from a database or generated in real time by using the second version of the web page.

The first version of the web page can be a summary version of the web page designed for viewing on a miniature display and the second version of the web page can be a full-page version of the web page designed for viewing on a conventional display. However, in a broader sense, the invention is intended to includes selecting a version of the web page from two or more available versions and to do so on the basis of characteristics of a requesting computer.

In another aspect of the invention, the detection of hardware used by the client includes the detection of the client's display capability. This can include, for example, determining that the display is a miniature display.

These and other features of the invention will be apparent from the following detailed description and the accompanying figures, in which:

DESCRIPTION OF DRAWINGS

FIG. 1 illustrates a system for carrying out the invention;

FIG. 2 illustrates a conventional display showing a full-page version of a web page and miniature displays showing full-page and summary versions of the

web page; and

FIG. 3 shows a reminisce window.

DETAILED DESCRIPTION

FIG. 1 shows an example of a system **10** incorporating the invention. The illustrated system **10** includes a server **12** that communicates with clients, such as a desktop computer **11** and a hand-held computer **15**, over a global computer network. The desktop computer **11** typically communicates with the server **12** over a land-line link **21**. In contrast, the hand-held computer **15** typically communicates with the server over a wireless link **27**.

The server **12** is also in communication with a full-page providing computer system **14** over an internet connection **16**. The full-page providing computer system **14** maintains full-page versions of a web page. Examples of full-page providing computer systems include corporate information sites having web pages with links to other web pages within the site, search engine sites that dynamically generate web pages of links in response to user search queries, retailer sites containing pages of links leading to descriptions of articles for sale, and government sites containing pages of agency information or documents.

The desktop computer **11** includes a conventional display **96** sized to accommodate the full width of a typical web page. In contrast, the hand-held computer **15** typically includes a miniature display **98**. The miniature display **98** is often so small that only a limited portion of a typical web-page can be displayed at any time. As a result, the user of a hand-held computer **15** must painstakingly scroll both horizontally and vertically to view a typical web-page.

To alleviate the tedium of scrolling through a typical web page using a miniature display **98**, the server **12** includes an interface **92** configured to detect the display limitations of the hand-held computer **15** and to store information indicative of these limitations in a display-capacity buffer **80**. On the basis of information in the display-capacity buffer **80**, the server **12** selects between serving a full-page version of the web page and an abbreviated summary version of the web page. The summary version of the web page is sized to accommodate the miniature display **98** of the hand-held computer

15.

When the server 12 detects a request for a web page, an input/output process ("I/O process") 86 executing on the server 12 transmits the address of the requested web page, along with the display capacity information from the display-capacity buffer 80, to a data-retrieval process 24. If the display capacity information indicates that the requesting client has a conventional display, the data-retrieval process 24 issues a request to the full-page providing process 18. The full-page providing process 18 retrieves the full-page version 152 of the web page from a full-page database 150 and returns it to the data-retrieval process 24. The data-retrieval process 24 then transmits the full-page version 152 for output by the I/O process 86 to the requesting client.

On the other hand, if the display capacity information indicates that the requesting client has a miniature display 98, the data-retrieval process 24 issues a summary-page data request to a summary-providing process 34 executing on a summary-providing computer 30. The summary-providing process 34 retrieves a summary-page version 35 of the web page from a summary database 36. If no such summary-page version 35 is available, the summary-providing process 34 establishes communications with the full-page providing process 18 to retrieve the full-page version 152. Upon receipt of the full-page version 152, the summary-providing process 34 creates a summary-page version by summarizing the full-page version 152 to fit within the display capacity of the miniature display 98. In either case, the summary-page version 35 is then transmitted to the data-retrieval process 24 and then through the I/O process 86 for output to the requesting hand-held computer 15.

FIG. 2 shows a first window 26 displaying an exemplary full-page version 40 of a web page as seen on the conventional display 96 of FIG. 1. FIG. 2 also shows two smaller windows, a second window 27A and a third window 27B, as seen on the miniature display 98 of FIG. 1. The second window 27A displays the same full-page version 40 of the web page as the first window 26. The third window 27B displays an exemplary summary-page version of the web page.

While browsing with a hand-held computer 15, a user may encounter a summary-page version of a web page containing information of particular interest. Such a user may wish to view a full-page version of the same web page during a later browsing session on

a desktop computer **11** having a conventional display **96**. To avoid having to jot down the address to the web page, the system creates and stores a virtual bookmark leading to the web page. In one embodiment of the invention, a user interacts with the window to cause the transmission, to the server **12**, of a "remember" instruction, together with information identifying the web page.

Each window **26,27A,27B** also includes a "Remember" button **70,70A** that, when selected by a user, causes the address of the web page being displayed in the window **26,27A,27B** to be transmitted to the I/O process **86** running on the server **12**. The I/O process **86** then transmits the address information to a remember/reminisce process **43** that communicates with a virtual-bookmark process **41** on a user-profile computer **39**. In response to an instruction from the I/O process, the virtual-bookmark process **41** stores the virtual bookmark **33** to be stored in a user-profile database **38** maintained on the user-profile computer **39**. The virtual bookmark **33** typically includes the web page address, or URL, to enable retrieval of the web page, and a title to enable the user to easily recognize the web page on a list of available web pages.

The illustrated "Remember" button **70,70A** is but one user-interface element for storing a link to a web page. In alternative embodiments, a user stores a link to a web page by choosing a menu command or, by uttering pre-defined words. The "remember" instruction can also be programmed to transmit additional information to the user-profile computer system **39**. Such additional information can include, for example, information regarding the user. Such information can be used for marketing purposes or for finding additional pages of interest for the user.

At a subsequent browser session on a desktop computer **11** the user may want to retrieve stored bookmark information from the user-profile database **38**. Referring again to FIG. 2, each window **26,27A,27B** also includes a "Reminisce" button **74,74A** that, when selected by the user, causes the remember/reminisce process **43** to transmit a bookmark request to the virtual-bookmark process **41**. The virtual-bookmark process **41** then retrieves virtual bookmark **33** from the user-profile database **38** and assembles a reminisce page **76** that lists the titles of all web pages that the user has saved using the "Remember" button. Clicking on any title in the reminisce page causes an appropriate version of the corresponding web page to be loaded.

FIG. 3 shows a window **106** displaying an exemplary reminisce page **76**. The reminisce page **76** displays a list of titles **108A-E** representing previously remembered bookmarks **33**. As indicated by the underlining, the titles **108A-108E** lie within active regions. Each active region has a target site corresponding to the remembered web page. As a result, a user who views the reminisce window **76** can readily jump to one of the remembered web pages listed in the reminisce window **76** by clicking on its corresponding title.

Referring again to FIG. 2, the illustrated "Reminisce buttons" **74,74A** are but one user-interface element for executing instructions for recalling remembered links to user-selected target documents. In alternative embodiments, a user can execute those instructions by choosing a menu command or by uttering pre-defined words.

As suggested by FIG. 1, the summary database **36**, the user-profile database **38** and the full-page database **150** are associated with computers **30, 39** and **14** that are remote from the client system **12**. However, in an alternative embodiment, the summary database **36**, the user-profile database **38** and the full-page database **150** can be maintained at the server **12**.

Although FIG. 1 illustrates multiple computers **12,14,30,39** in communication over an internet connection **16**, it will be understood that other connections between computer systems are within the scope of the invention. For example, the computers **12,14,30,39** can be connected through a local area network.

The summary-providing computer system **30** includes software for maintaining a file structure for storage of summaries of large numbers of documents. These summaries can be created in a variety of ways. For example, human editors can be employed to create the summaries. Alternatively, summaries can be machine generated by a summary generation engine. The specific manner in which the summaries are generated is not important to the structure and operation of the invention.

By convention, the summary-providing computer system **30** maintains the summaries in directories that are named to correspond to the URL leading to the document being summarized. For example, a summary of the document found at

"ftp://www.mwdesign.co.uk"

would be kept in a directory named

"www.mwdesign.co.uk"

in a file structure accessible to the summary-providing computer system **30**. This is advantageous since the summary-providing computer system **30** can then access the summary by simply stripping away the domain name prefixed to the summary URL already provided by the data-retrieval process **24**.

One of ordinary skill in the art will recognize that other conventions for storing full-page data can be devised. The selection of such a convention is a mere implementation detail. Hence, a convention other than those specifically disclosed herein is within the scope of the present invention.

The summary pages presented can include interactive features in addition to those already described. For example, the summary pages may include a note-appending feature to allow a user to associate text of other objects with a particular summary. Or the summary page can include a facility for executing a customized user-defined script. Such a script may cause transmission of the full-page data to another application, for example by email.

A typical browser process provides for the display of a page, within a window, that includes "active" regions. The active regions are associated with instructions to be executed upon the occurrence of an event within an active region. By far the most common instructions provided on a typical page are instructions to jump to a specified location upon the occurrence of a mouse-click within the active region. Other events can also cause the execution of instructions. In particular, the entry of a mouse pointer into an active region, without a click of the mouse button, is an event that can be used to trigger the execution of instructions associated with that region.

The foregoing detailed description describes but one of many embodiments of the invention. It is therefore intended to be illustrative of the invention and not to be limiting in any way. For example, the description describes a system having a plurality of different computer systems interconnected by a global computer network such as the internet. However, it will be appreciated by one of ordinary skill in the art to which the invention pertains that the different computer systems can be integrated into a smaller

number of computer systems or into a single computer system. It will also be appreciated by one of ordinary skill in the art that the different computer systems can be interconnected by networks other than the internet. Although the description suggests that the different computer systems that participate in the implementation of the method of the invention are geographically dispersed, one of ordinary skill will recognize that this need not be the case. Two or more of these different computers can be located proximate to each other without departing from the scope of the invention.

The specific embodiment set forth above describes a system in which the output data is displayed as text and graphics on a computer systems monitor or output screen. However, this is not intended to preclude the use of other output systems. For example, depending on the nature of the output device, a computer system incorporating the invention can also provide audible output.

The specific embodiment set forth above describes a system in which user input is achieved by using a mouse or other pointing device connected to a computer. This is not meant to preclude the use of other mechanisms for providing input. For example, a user may provide input by speaking commands, using an eye-tracking device, or through a command line interface and keypad.

The specific embodiment set forth above illustrates several computers that are in communication with the system over several different communication connections. These connections can be, for instance, a telephone modem, a co-axial modem, an Ethernet device, or a wireless transmitter/receiver. It will be understood that other communication connections are within the scope of the invention.

The specific embodiment set forth above illustrates multiple interface devices on the system. Each interface device represents either a separate communication link or an individual port of a multi-ported communications device. Each interface device establishes two-way communication according to a suitable communications protocol, such as, telephone modulation/demodulation, digital subscriber line, Ethernet, BLUETOOTH(tm) or local area network. It will be understood that other interface devices and communication protocols to enable communication with any suitable input/output device are within the scope of the invention.

As used herein, the term "computer system" refers to a physical machine having

one or more processing elements and one or more storage elements in communication with the one or more of the processing elements. The term "process" refers to software that is being run on a computer system.

The foregoing description is thus an aid in determining the scope of the invention. It is not definitive of that scope. The limits of the invention are defined only by the appended claims.

The foregoing description presents an embodiment in which information is passed between a user and a computer system using conventional means such as a display monitor, a keyboard, and a pointing device, such as a mouse. However, this is not meant to preclude the use of other mechanisms for passage of information between a user and a computer system. Other mechanisms for delivering information from a user to a computer system include:

(1) an audio interface that recognizes spoken commands;

(2) an eye-tracking device that recognizes where a users eyes are pointing and processes this information to determine the information that a user wishes to communicate;

Other mechanisms for delivering information from a computer system to a user include:

(1) a speech synthesizer that delivers information to a user by means of spoken words.

Certain terms used throughout this specification and claims, although originating in the context of conventional visual displays, are intended to include corresponding functions in the context of other types of information delivery. For example:

(1) "Display" refers to the presentation of information, and includes, in addition to a visual display, a spoken recitation of information. Indeed, the Latin root of "display," which is "displicare," means "to unfold" and carries no implication of visual, as opposed to audio, presentation of information.

(2) "Window" refers to any set of information available for presentation to a user.

A "window" can include information displayed in a portion of a visual computer display. However, a window can also encompass the entire visual computer display. In the context of the audio delivery of information, a "window" refers to the set of information that can be spoken to the user upon the users request.

(3) "Formatting" refers to the enhancement of the information to be presented to the user. In the context of a video display, formatting has its conventional meaning in the art of changing fonts and layout of text and other objects, changing display colors, and similar functions. In the context of an audio display of information, formatting may include the manner in which words are spoken, for example volume, pitch, length of intervals between words, the setting of an option to read punctuation aloud, the accent to be used, and the like.

In addition, the foregoing description and claims refer to the display of a document "summary." As used herein, "summary" is intended to include any information indicative of the content of the document. Such information can be derived from information within the document itself or from information gathered from outside the document.

Although the invention has been described above in the context of one embodiment, this is but one of many embodiments that incorporate the principles of the invention. The foregoing description is illustrative the invention and is therefore not to be construed as limiting the scope of the invention. Rather, the scope of the invention is to be determined by the appended claims.

Having described the invention, and a preferred embodiment thereof, what we claim as new, and secured by letters patent is:

CLAIMS

1. A method for saving a location of a web page for later recall, the method comprising:

serving a first version of the web page to a client; and

in response to a client input, storing information identifying a location from which a second version of the web page is available.

2. The method of claim 1, wherein serving a first version of the web page comprises:

detecting hardware used by a client;

requesting a first version of the web page, the first version having content consistent with the detected hardware; and

serving the first version of the web page to the client.

3. The method of claim 1, wherein storing information identifying a location from which a second version of the web page is available comprises:

providing a user-interface element for display on the client, the user-interface element being associated with instructions for saving information identifying a location of the web page

detecting a selection of the user-interface element.

4. The method of claim 1 wherein storing information identifying a location from which a second version of the web page is available comprises:

storing first information descriptive of the client;

storing second information identifying a location from which a second version of the web page is available;

maintaining a link indicative of a relationship between the first and second information.

5. The method of claim 1, further comprising selecting the first version to be a summary version of the web page.

6. The method of claim 1, further comprising selecting the second version to be a full-page version of the web page.

7. The method of claim 1, wherein detecting hardware used by the client comprises detecting a display capability of the client.

8. The method of claim 7, wherein detecting the display capability comprises determining that the display is a miniature display.

9. The method of claim 2, further comprising generating the first version of the web page.

10. The method of claim 9, wherein generating the first version of the web page comprises:

retrieving the second version of the web page; and

processing the second version the web page to generate the first version of the web page.

11. The method of claim 10, wherein processing the second version of the web page comprises summarizing the second version of the web page.

12. A computer-readable medium having encoded thereon software for saving a location of a web page for later recall, the software comprising instructions for:

serving a first version of the web page to a client; and

in response to a client input, storing information identifying a location from which a second version of the web page is available.

13. The computer-readable medium of claim 12, wherein the instructions for serving a first version of the web page comprise instructions for:

detecting hardware used by a client;

requesting a first version of the web page, the first version having content consistent with the detected hardware; and

serving the first version of the web page to the client.

13. The computer-readable medium of claim 12, wherein the instructions for storing information identifying a location from which a second version of the web page is available comprise instructions for:

providing a user-interface element for display on the client, the user-interface element being associated with instructions for saving information identifying a location of the web page

detecting a selection of the user-interface element.

14. The computer-readable medium of claim 12 wherein the instructions for storing information identifying a location from which a second version of the web page is available comprise instructions for:

storing first information descriptive of the client;

storing second information identifying a location from which a second version of the web page is available;

maintaining a link indicative of a relationship between the first and second information.

15. The computer-readable medium of claim 12, further comprising selecting the first version to be a summary version of the web page.

16. The computer-readable medium of claim 12, further comprising selecting the second version to be a full-page version of the web page.

17. The computer-readable medium of claim 12, wherein the instructions for detecting hardware used by the client comprise instructions for detecting a display capability of the client.

18. The computer-readable medium of claim 17, wherein the instructions for

detecting the display capability comprise instructions for determining that the display is a miniature display.

19. The computer-readable medium of claim 13, wherein the software further comprises instructions for generating the first version of the web page.

20. The computer-readable medium of claim 19, wherein the instructions for generating the first version of the web page comprise instructions for:

retrieving the second version of the web page; and

processing the second version the web page to generate the first version of the web page.

21. The computer-readable medium of claim 20, wherein the instructions for processing the second version of the web page comprise instructions for summarizing the second version of the web page.

22. A method for saving a location of a full-page version of a web page, the method comprising:

serving a summary-version of the web page;

in response to user-input, storing information identifying the location of the full-page version of the web page.

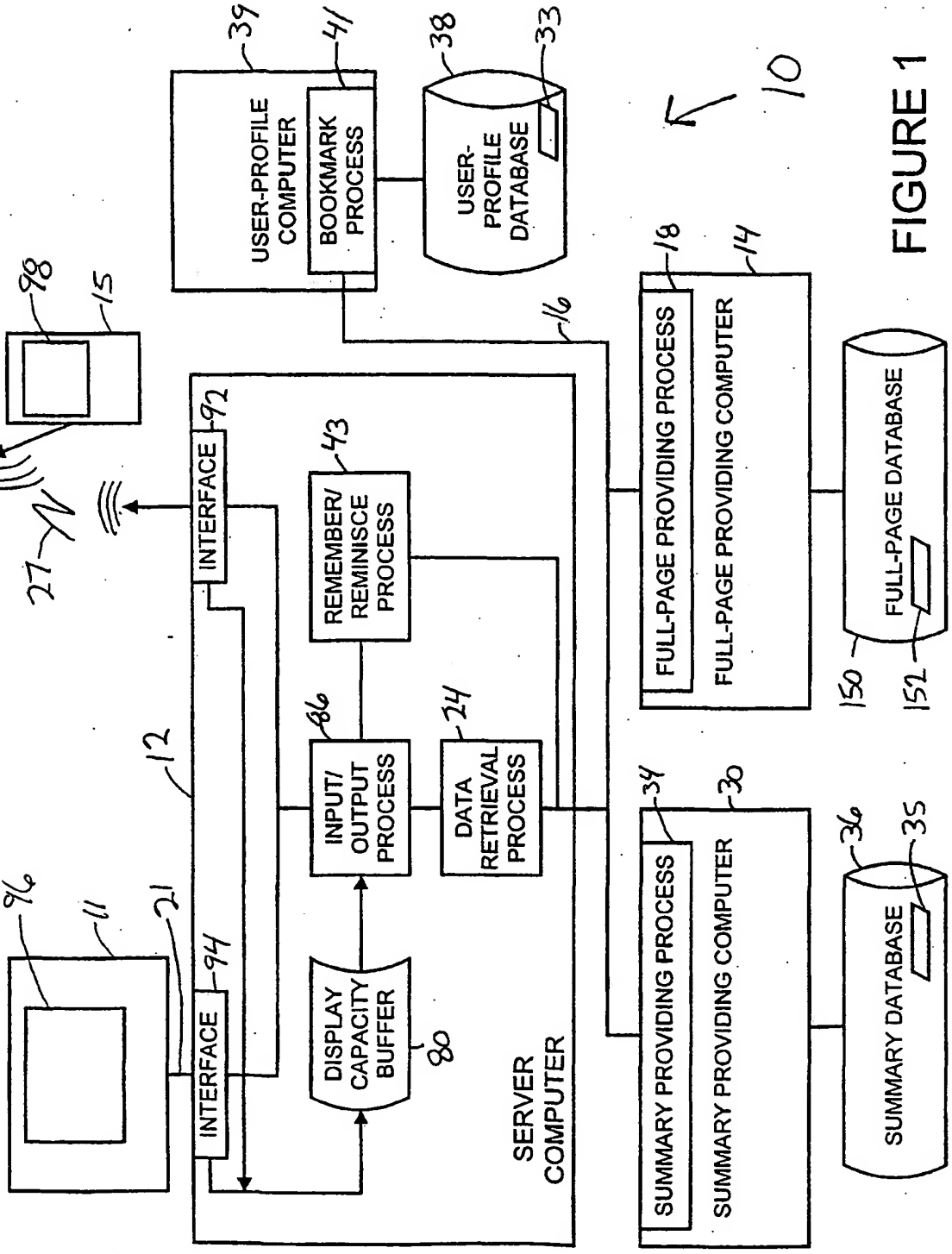

USER-PROFILE COMPUTER
BOOKMARK PROCESS
USER-PROFILE DATABASE
39
41
38
33
10
98
15
16
18
FULL-PAGE PROVIDING PROCESS
FULL-PAGE PROVIDING COMPUTER
14
FULL-PAGE DATABASE
150
152
INTERFACE
92
27
REMEMBER/ REMINISCE PROCESS
43
12
86
INPUT/ OUTPUT PROCESS
24
DATA RETRIEVAL PROCESS
96
11
21
94
DISPLAY CAPACITY BUFFER
80
SERVER COMPUTER
34
30
SUMMARY PROVIDING PROCESS
SUMMARY PROVIDING COMPUTER
36
35
SUMMARY DATABASE

FIGURE 1

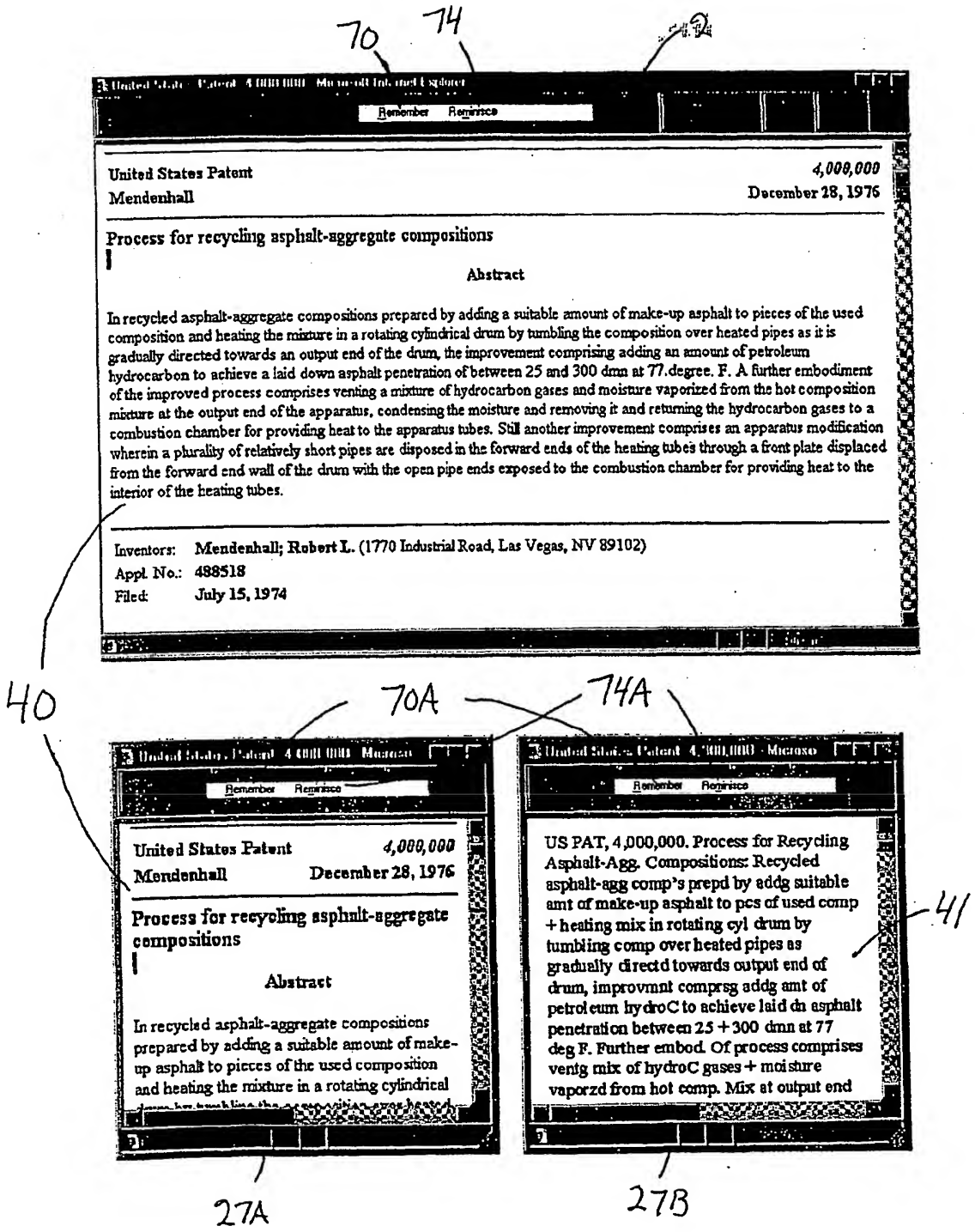

70
74
72
Remember Reminisce
United States Patent
Mendenhall
4,008,000
December 28, 1976
Process for recycling asphalt-aggregate compositions
Abstract
In recycled asphalt-aggregate compositions prepared by adding a suitable amount of make-up asphalt to pieces of the used composition and heating the mixture in a rotating cylindrical drum by tumbling the composition over heated pipes as it is gradually directed towards an output end of the drum, the improvement comprising adding an amount of petroleum hydrocarbon to achieve a laid down asphalt penetration of between 25 and 300 dmn at 77.degree. F. A further embodiment of the improved process comprises venting a mixture of hydrocarbon gases and moisture vaporized from the hot composition mixture at the output end of the apparatus, condensing the moisture and removing it and returning the hydrocarbon gases to a combustion chamber for providing heat to the apparatus tubes. Still another improvement comprises an apparatus modification wherein a plurality of relatively short pipes are disposed in the forward ends of the heating tubes through a front plate displaced from the forward end wall of the drum with the open pipe ends exposed to the combustion chamber for providing heat to the interior of the heating tubes.
Inventors: Mendenhall; Robert L. (1770 Industrial Road, Las Vegas, NV 89102)
Appl. No.: 488518
Filed: July 15, 1974
40
70A
74A
Remember Reminisce
United States Patent
Mendenhall
4,000,000
December 28, 1976
Process for recycling asphalt-aggregate compositions
Abstract
In recycled asphalt-aggregate compositions prepared by adding a suitable amount of make-up asphalt to pieces of the used composition and heating the mixture in a rotating cylindrical
US PAT, 4,000,000. Process for Recycling Asphalt-Agg. Compositions: Recycled asphalt-agg comp's prepd by addg suitable amt of make-up asphalt to pcs of used comp + heating mix in rotating cyl drum by tumbling comp over heated pipes as gradually directd towards output end of drum, improvmnt comprsg addg amt of petroleum hydroC to achieve laid dn asphalt penetration between 25 + 300 dmn at 77 deg F. Further embod. Of process comprises ventg mix of hydroC gases + moisture vaporzd from hot comp. Mix at output end
41
27A
27B

FIG. 2

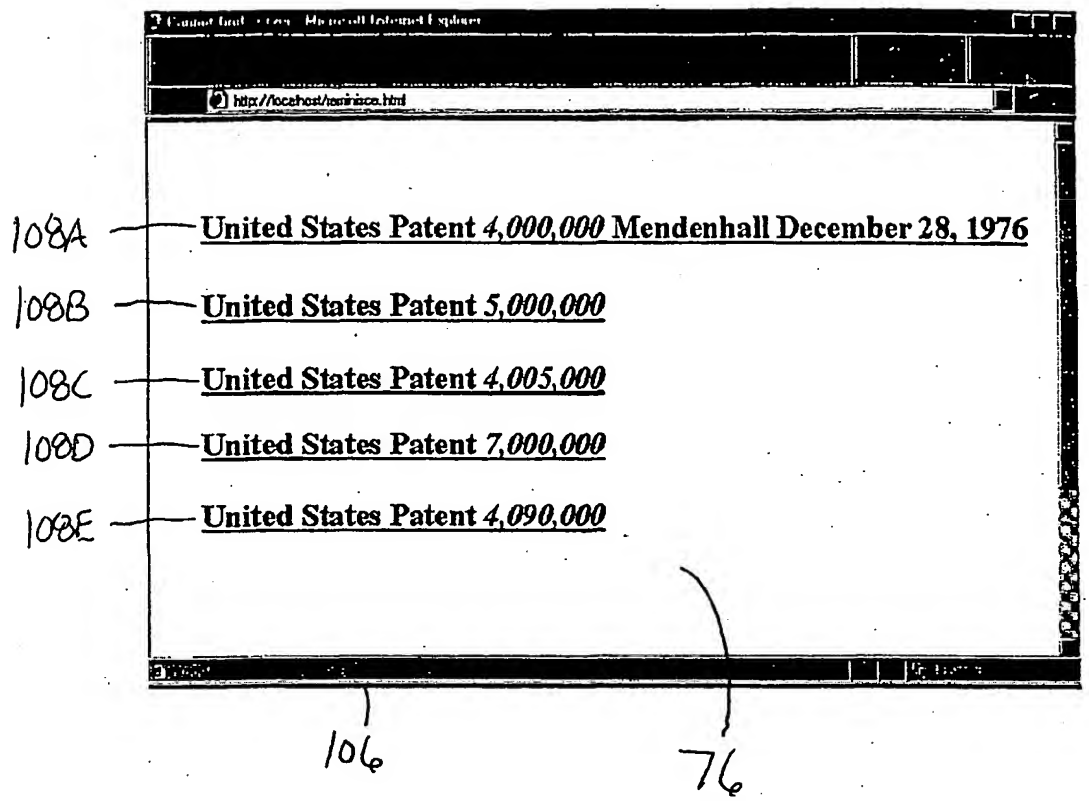

http://localhost/reminisce.html
108A
United States Patent 4,000,000 Mendenhall December 28, 1976
108B
United States Patent 5,000,000
108C
United States Patent 4,005,000
108D
United States Patent 7,000,000
108E
United States Patent 4,090,000
106
76

FIG. 3

INTERNATIONAL SEARCH REPORT

International application No.
PCT/US02/01989

A. CLASSIFICATION OF SUBJECT MATTER

IPC(7) :G06F 3/00, 19/00, 15/00, 17/00

US CL :Please See Extra Sheet.

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

U.S. : 709/217-219; 345/721, 737-747, 764-768, 774-778, 850-855; 707/1, 5, 501.1, 513-516, 524, 526

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

EAST 1.3 (USPAT; EPO; JPO; DERWENT; IBM_TDB)

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 5,572,643 A (JUDSON) 5 November 1996, Abstract, FIGs. 3-5, cols. 1-3, 5, 6 & 8.	1,3-6,9-12,14-17 & 20-23
X	US 6,133,916 A (BUKSZAR et al.) 17 October 2000, Abstract, FIGs. 1-6, cols. 2-9.	1,3-6,9-12,14-17 & 20-23
Y	US 5,054,055 A (HANLE et al.) 1 October 1991, col. 5, lines 28-39 & 44-47.	2,7,8,13,18 & 19
A	US 5,708,825 A (SOTOMAYOR) 13 January 1998, Abstract, FIGs. 3-8 & 10 and associated text, "summary page".	1,3-6,9-12,14-17 & 20-23
Y	US 5,943,679 A (NILES et al.) 24 August 1999, FIGs. 5 & 6 and associated text.	2,7,8,13,18 & 19

☐ Further documents are listed in the continuation of Box C. ☐ See patent family annex.

*	Special categories of cited documents:	"T"	later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
"A"	document defining the general state of the art which is not considered to be of particular relevance	"X"	document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
"E"	earlier document published on or after the international filing date	"Y"	document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art
"L"	document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)	"&"	document member of the same patent family
"O"	document referring to an oral disclosure, use, exhibition or other means		
"P"	document published prior to the international filing date but later than the priority date claimed		

Date of the actual completion of the international search 20 MAY 2002	Date of mailing of the international search report 13 JUN 2002
Name and mailing address of the ISA/US Commissioner of Patents and Trademarks Box PCT Washington, D.C. 20231 Facsimile No. (703) 305-3230	Authorized officer TUAN Q. DAM Peggy Harrod Telephone No. (703) 305-3900

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INTERNATIONAL SEARCH REPORT

International application No.
PCT/US02/01989

A. CLASSIFICATION OF SUBJECT MATTER:
US CL :

709/217-219; 345/721, 737-747, 764-768, 774-778, 850-855; 707/1, 5, 501.1, 513-516, 524, 526

Form PCT/ISA/210 (extra sheet) (July 1998)*